DOCUMENT RESUME

ED 163 883 HE 010 782

AUTHOR Campos-Arcia, Maria; McVay, Julie
TITLE Graduate Foreign Student Admissions Decision-Making: An Application of the JAN Technique.
PUB DATE 27 Oct 78
NOTE 16p.; Paper presented to the Southern Association for Institutional Research (Nashville, Tennessee, October 26-27, 1978)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Administrative Personnel; Administrative Policy; *Admission Criteria; College Admission; Decision Making; *Foreign Students; *Graduate Study; Higher Education; *Institutional Research; *Multiple Regression Analysis; Predictor Variables; Rating Scales; Research Projects; Student Characteristics
IDENTIFIERS *Judgment Analysis Technique; *North Carolina State University

ABSTRACT

A study was conducted to identify the variables that are relevant to the admission of foreign students by institutional decision-makers. A profile of foreign students at North Carolina State University (NCSU) is provided. All academic departments at NCSU at Raleigh with enrollments of 10 or more foreign graduate students were contacted to interview the graduate administrator or department head. At the end of the interview, the administrator completed a rating scale designed to provide a more objective estimate of the importance of admission variables. The four most important variables identified were: undergradaute academic record, GRE quantitative score, TOEFL score, and letters of recommendation. Simulated student profiles were constructed using the four variables in various combinations. Fifty-two of 85 sampled faculty members having admission responsibilities provided usable response on the profile sheets. The data were analyzed using the Judgment Analysis Technique, which uses a multiple linear regression approach to identify and described the rating policies existing within a board or committee of judges. Fourteen judgmental policies were identified, but they were subsumed under seven different regression models. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED163883

S A I R

GRADUATE FOREIGN STUDENT ADMISSIONS DECISION-MAKING: AN APPLICATION OF THE JAN TECHNIQUE

Presented to the
Southern Association for Institutional Research
Nashville, Tennessee
October 26-27, 1978

Maria Campos-Arcia
Julie McVay
School of Education
North Carolina State University
Raleigh, North Carolina

HE010782

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Southern assn. for Instit. Research

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

INTRODUCTION

Foreign students have been part of the American educational scene since the eighteenth century, but especially after World War II has the impact of thousands of international students on universities and colleges campuses been felt. In approximately 50 years the number of foreign students in the United States has increased from 7,000 to 200,000 bringing the graduate foreign student "industry" to an order of magnitude in costs, visible and invisible, of about one half billion dollars a year.

It seems reasonable to agree with those who assert that the admission of foreign students to American institutions has become a crucial issue. Admissions decisions have repercussions not only for the student, but also for the institution, the sponsoring country, and the United States. In that sense there is a need in the general area of decision making, including the area of graduate school admissions, to identify those variables which are considered to be relevant to the admission of foreign students by institutional decision makers. This need was transformed into the objective of this study.

Purposes

The purposes of this study were:

1. To determine if one or more judgmental policies regarding the admissions of foreign graduate students existed within selected faculty members at North Carolina State University.
2. To determine if a common judgmental policy regarding admissions of foreign graduate students was shared by members of the same academic department.
3. To determine if a common judgmental policy regarding admissions of

foreign graduate students was shared by faculty members with similar amount of experience in admissions of foreign students.

4. To determine if faculty members held consistent judgmental policies regarding the admission of graduate foreign students.

(Emphasis at the SAIR conference presentation will be on purpose #1).

Foreign Students at North Carolina State University

In the fall of 1958 the total number of students at NCSU was 5,687 with a foreign student enrollment of 187 (106 undergraduates and 81 graduates) accounting for 3% of the enrollment for that year. In the Spring semester of 1978, 17,000 students were enrolled at NCSU, 747 of them foreign (4.4%). Of these 277 (37%) were undergraduate and 470 (63%) were graduate students. A large majority were male, representing 85% and 88% of the undergraduate and graduate foreign students enrollment respectively. Female foreign students represented about 13% of all the foreign student enrollment and 0.64% of the total enrollment at NCSU in the Spring semester of 1978. (The total enrollment of NCSU was 69% male and 31% female.)

In terms of geographic distribution, a total of 71 countries was represented at NCSU, Iran and China being the two countries with the largest undergraduate (22.4%) and graduate (19.2%) representation, respectively. In both instances 10 countries shared approximately 65% of the total foreign student enrollment. Table 1 further illustrates the foreign student enrollment at NCSU in the spring semester of 1978.

Table 1

Foreign Student Enrollment at North Carolina State University by School and Classification, Spring 1978.*

	Undergraduate			Graduate		
School	Total	Foreign	Percent	Total	Foreign	Percent
Textiles	555	18	3.5	86	29	33.7
Engineering	3,437	133	3.9	455	149	32.7
Phys. & Math. Sci.	882	21	2.4	274	79	28.8
Forest Resources	844	10	1.2	123	35	28.5
Agri. & Life Sci.	2,452	30	1.2	696	135	19.4
Hum. & Social Sci.	2,930	20	0.7	216	20	9.3
Design	336	7	2.1	137	3	2.2
Education	579	3	0.5	512	7	1.4

*Source: Division of Planning and Research, North Carolina State University.

In summary, foreign students at NCSU are, generally, males, graduate students, from China and Iran, and in the fields of Agriculture, Engineering, and Physical and Mathematical Sciences. In four of its eight schools, foreign students constituted about one third of the total graduate enrollment in the spring semester of 1978.

Related Literature

The review of literature exhibits several distinctive characteristics in three areas: (1) correlational studies between selected predictor variables and academic achievement of foreign students (2) information processing in judgment and (3) use of JAN in educational research.

They are summarized below.

(1) Standardized tests like TOEFL, GRE, SCAT, SAT, have been of little value in predicting achievement of foreign students. Different variables have been found to be significantly related to achievement, but a pattern does not seem to be apparent. Some of the variables found to be significant can be tied together; for example, age and marital status, native language and geographic region, type of financial support and type of visa held, etc. English proficiency has been found to be related to foreign students' achievement in some studies and unrelated in others, which makes difficult any generalization.

Only one study reported the use of undergraduate grades as a predictor of foreign student achievement. Undergraduate GPA has been found to be a moderately good predictor of graduate school success for American students, but for foreign students the lack of comparability in the grading systems of different institutions and countries makes it difficult to include undergraduate GPA in a prediction equation.

(2) The linear model on which JAN is based constitutes an adequate representation of a judge's decision-making process when monotonically related variables are used. The research seems to indicate that increasing the number of cues or factors results in an increase of confidence without increasing the "quality" of the decisions made.

(3) The JAN technique has been successfully used in capturing policies of judges and in clustering them, when they are asked to respond to a series of stimuli. JAN has been used in the study of admission policies, but only one study was found on the admission policies for foreign graduate students. One of the predictors used was first semester grade point average. In a real situation, however, decisions must be made before the student arrives and before

the decision-maker has had an opportunity to observe the student's performance. In the present case, we have tried to study the admission process as it occurs, that is, to consider only variables that are available to graduate administrators or admission committees at the time the decision has to be made. The following research questions were formulated.

Research Questions

Do there exist one or more judgmental policies regarding the admission of foreign graduate students within selected faculty members at North Carolina State University? Is there a single judgmental policy being used by members of the same academic department? Is there a single judgmental policy being used by faculty members with similar lengths of time of experience in graduate foreign students admissions? What are the significant variables in the identified policy or policies? Are selected faculty members at North Carolina State University consistent in their individual policies?

Definition of Terms

Foreign Student: "An alien having a residence in a foreign country which he has no intention of abandoning, who is a bona fide student qualified to pursue a full course of study, and who seeks to enter the United States temporarily and solely for the purpose of pursuing such a course of study at an established institution of learning or other recognized place of study in the United States...." (U.S. Department of Justice, 1953). For purposes of this study "foreign student" refers to students in post-secondary institutions.

Graduate Foreign Student: A foreign student as defined above, who has been officially granted admission to pursue a graduate program of study in an American university. Particularly, it refers to students to whom official admission has been granted by the Graduate School of North Carolina State University at Raleigh.

Judge:	A person who gives an authoritative opinion (Webster's New Collegiate Dictionary, 1973). Particularly, it refers to a faculty member with admission responsibilities in the graduate academic departments of North Carolina State University at Raleigh selected for this study.
Policy:	"What judges do" when they are asked to respond to a series of stimuli.
To capture a policy:	The extent of which one can predict the actions of a judge from the known characteristics of the stimuli he is being required to evaluate.
Clustering:	The grouping of judges relative to the homogeneity that exists between their policies.

METHODS AND PROCEDURES

Two stages were designed and implemented to identify variables for use in the judgment analysis procedure. In stage one all academic departments at North Carolina State University at Raleigh with enrollments of 10 or more foreign graduate students were contacted and a interview with the graduate administrator or departamental head was scheduled. The purposes of the interview were to identify the general procedures that were being followed in making decisions on the admission of foreign graduate students and the variables that were considered important in making such decisions. In stage two a set of simulated student profiles was constructed.

At the end of each interview, in stage one, the interviewee was asked to complete a rating scale designed to obtain a more objective estimate of the importance of admissions variables. This 5-point rating scale with values ranging from "very important" (1) to "not important at all" (5) included a set of variables that, according to the review of literature, have been most commonly used in the prediction of graduate foreign students' success. The variables included were: sex, age, marital status, country of origin, years

out of school, job experience, undergraduate academic record, English proficiency (as measured by the Test of English as a Foreign Language, TOEFL) GRE verbal, GRE quantitative, GRE total, and type of financial support.

Based on the interviews and the ratings, four variables were selected as being the most important ones considered in the admission process of graduate foreign students that were common to all the academic departments included in this study. These variables were: undergraduate academic record, GRE quantitative, TOEFL, and letters of recommendation.

Stage two involved constructing a profile sheet using the four variables in various combinations to simulate 40 unique "students". Before the final set of profiles was constructed, three trials were conducted. Based on the results of these trials, sets of profiles in final form were constructed.

Sets of profiles in their final form were sent to 85 faculty members in 16 academic departments at NCSU. The selection of faculty members was based on whether or not they had admissions responsibilities in their departments. A cover letter explaining the purposes of the study was attached to each set of profiles. Additional pages contained definitions of variables, instructions, and space for comments. After a follow-up, a total of 63 responses was received and the final analyses were made using 52 of those.

Characteristics of Generated Profiles

Independent Variables

Forty simulated profiles were generated based on four variables that represented the predictors or independent variables. Those were:

1. Grade point average equivalent (GPA).
2. Test of English as a Foreign Language (TOEFL).
3. Graduate Record Examination-Quantitative (GRE).
4. Letters of recommendation.

Criterion Variable. The criterion variable was the rating given to each of the 40 profiles by 52 judges. Each profile response was evaluated on a 5-point scale ranging from "superior" to "poor" and coded 1 to 5 in one-to-one correspondence with the level checked.

Selection of Generated Profiles. One hundred and forty-four profiles were initially generated using the four variables mentioned above and 40 of them were randomly selected.

Judges

All graduate administrators and members of admissions committees from 16 graduate academic departments with enrollments of 10 or more graduate foreign students in the Spring Semester 1978 were asked to participate in this study. In those departments in which additional faculty members were involved in the admissions process a random sample of those faculty members was selected and asked to participate. The number of participants by departments selected for this study ranged from 1 to 10. The responses of 52 judges (61% of the original sample) from 16 graduate academic departments were finally used.

Method of Statistical Analysis

The data were analyzed using the Judgment Analysis technique (JAN). JAN is a technique developed by Bottenberg and Christal[1], which uses a multiple linear regression approach to identify and describe the rating policies that exist within a board or committee of judges. If the policies of a group of judges are not homogeneous, as expressed by their regression equations, the source of disagreement in terms of specific factors can be located and the nature of the policy structure in the groups can be identified using this anal-

[1]A computer program was made available by S.R. Houston, University of Northern Colorado.

ysis technique.

A judge's policy can be described by employing a multiple regression equation as follows:

$$Y_i = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_m X_m + E$$

where:

Y_i is the judge's decision,

$X_j, j=1,\underline{m}$ are the $\underline{m}$ cues or variables upon which the decision is based,

$\beta_j, j-1,\underline{m}$ are the $\underline{m}$ beta weights which indicate the relative importance of each cue for the judge's decision,

β_o is a constant,

E is anerror term.

One can, then, determine the weight or relative importance a judge places on each variable by examining the beta weights. The larger the beta weight the more important the variable. A positive beta weight indicates a positive linear function form (the "more" of a variable, the better it is) and a negative beta weight indicates a negative linear function form (the "less" of a variable, the better it is).

Beginning with the above equations the JAN technique uses an iterative method of clustering criteria that retains optimum predictive efficiency.

RESULTS

Tables 2, 3 and 4 summarize the results in terms of the regression models of the clusters identified by JAN.

Table 2

Regression Models for the 14 Systems Identified by JAN

System Number	Variables in Model	Judges in System	R^2	Beta weights			
				GPA	TOEFL	GRE	LR
1	GPA. TOEFL, GRE, LR	2,11, 13,49,46,18, 36,52	.6534	.63	.11	.39	.25
2	GPA, TOEFL, GRE, LR	3,8,30,17,40,43, 16,22,23	.6850	.51	.20	.52	.26
3	GPA, TOEFL, GRE, LR	6,10,9,31,34,45	.7127	.43	.46	.52	.18
4	GPA, TOEFL, GRE, LR	24,29,41	.7863	.43	.38	.56	.31
5	GPA, TOEFL, GRE, LR	26,37,38	.8345	.35	.17	.80	.14
6	GPA, TOEFL, GRE	20,51,44,50	.7245	.17	.34	.77	.08
7	GPA, TOEFL, GRE	1,12,19	.6811	.33	.32	.69	.05
8	GPA, TOEFL, GRE	27,35	.6758	.29	.62	.49	.03
9	GPA, GRE, LR	4,5,14	.5494	.29	.16	.58	.28
10	GPA, LR	7,39	.7588	.45	.11	.14	.71
11	GRE, LR	21,28,42,[illegible]2	.8332	.08	.03	.88	.18
12	GPA, GRE	25,48	.8599	.44	.02	.81	.10
13	GPA, GRE	15,3[illegible]	.8285	.88	-.06	.24	08
14	GRE	47	.7130	-.05	.14	.85	-.06

Table 3

Regression Models for the Systems Identified by JAN in 16 Academic Departments

Department	Variables in Model	Judges	R^2
1	GPA, TOEFL, GRE, LR	1,2,3	.6554
	GPA, TOEFL, GRE	4,5	.7128
2	GPA, TOEFL, GRE, LR	6,8,9,10	.7411
	GPA, LR	7	.8582
3	GPA, TOEFL, GRE, LR	11,12,13	.5879
	GPA, GRE, LR	14	.7339
	GPA	15	.9002
4	GPA, GRE, LR	21	.9339
	GPA, GRE	20,22	.7246
5	GPA, TOEFL, GRE, LR	24,25	.7730
	GPA, TOEFL, GRE	23	.8175
6	GPA, TOEFL, GRE, LR	26,28	.8198
	GPA, TOEFL, GRE	27	.7892
7	GPA, TOEFL, GRE, LR	30	.7144
	GPA, TOEFL, GRE	29	.6420
8	GPA, TOEFL, GRE	50,51	.7313
	GPA, GRE	52	.6354
9	GPA, TOEFL, GRE, LR	16,17	.6604
	GPA, TOEFL, GRE	19	.7726
	GPA, GRE, LR	18	.6357
10	GPA, TOEFL, GRE, LR	34,36,37	.6227
	GPA, TOEFL, GRE	35	.6577
11	GPA, TOEFL, GRE, LR	43, 45	.7628
	TOEFL, GRE, LR	42,44	.8009
	GPA, GRE	46	.8371
12	GRE	47	.7130
13	GPA, GRE, LR	48	.9127
14	GPA, GRE	49	.7128

Table 3 (cont)

Regression Models for the Systems Identified by JAN in 16 Academic Departments

Department	Variables in Model	Judges	R^2
15	GPA, TOEFL, GRE, LR	39,49.41	.7225
	GPA, FRE	38	.8775
16	GPA, TOEFL, GRE, LR	31	.8562
	GPA, GRE	33	.8048
	GRE	32	.7960

Table 4

Systems Identified by JAN in Groups of Judges Classified by Years of Experience in Admissions

Years of Experience	Variables in Model	Judges	R^2
0 - 3	GPA, TOEFL, GRE, LR	8,22,43,10,24	.7035
	GPA, TOEFL, GRE, LR	13,23,30,45,34	.6332
	GPA, GRE, LR	2,49,18,36,14	.6068
	GPA, GRE, LR	25,28,37	.7779
4 - 9	GPA, TOEFL, GRE, LR	21,42,26	.8462
	GPA, TOEFL, GRE, LR	29,41,50	.7609
	GPA, TOEFL, GRE	1,16,9,4,19	.6382
	GPA, GRE, LR	11,46,33	.7513
	GPA, LR	7,39	.7588
10 or more	GPA, TOEFL, GRE, LR	3,6,31,17,40,12,52	.6486
	GPA, TOEFL, GRE, LR	20,51,38,48,32,44	.7109
	GPA, TOEFL, GRE	27,35	.7588
	GPA, TOEFL, GRE	5	.7369
	GPA	15	.9002
	GRE	47	.7130

Summary of Results

A single judgmental polciy regarding the admission of foreign graduate students was not found to exist within faculty members at North Carolina State University at Raleigh selected to participate in this study. Fourteen judgmental policies were identified through the use of the Judgment Analysis technique (JAN). When the identified policies were individually analyzed , it was found that they were not clearly distinct from each other in the sense that some of them shared the same regression models. The 14 judgmental policies identified by JAN could be subsumed under seven different regression models.

More than one judgmental policy was identified in the academic departments involved in this study.

Single judgmental policies were not found to exist in subgroups of judges with similar lengths of time of experience in graduate foreign student admissions.

The selected faculty members participating in this study were found to be highly consistent in their judgmental policies.

Some similarity between judges, and the number of profiles and predictors per profile that were used in the present study, seem to be responsible for the lack of effectiveness of the JAN technique in identifying clusters of judges whose policies were clearly distinct from each other. For smaller groups of judges, however, the technique worked effectively.